



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/565,653

01/24/2006

Koichi Kanaya

126247

6147

25944 7590 03/25/2008
OLIFF & BERRIDGE, PLC
P.O. BOX 320850
ALEXANDRIA, VA 22320-4850

EXAMINER

CHEN, KEATH T

ART UNIT

PAPER NUMBER

1792

MAIL DATE

DELIVERY MODE

03/25/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/565,653	Applicant(s) KANAYA ET AL.	
	Examiner KEATH T. CHEN	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 February 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 9-12, 15 and 16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 9-12, 15 and 16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 02/04/2008 has been entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
2. Claims 9, 11, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kokusai (JP 2000355766 a second English Translation as of 03/10/2008, hereafter '766), in view of Murakami (US 5088697, hereafter '697).

Art Unit: 1792

'766 teaches some limitations of claim 9:

A vapor phase growth method (Title and claim 2), comprising performing a vapor phase growth of a silicon ('766 translation, [0005]) epitaxial ([0001] layer on a main surface (Fig. 3, #5, the top of #5 is a main surface) of a silicon single crystal ([0003] and Fig. 1, #16, epitaxial growth has to be on single crystal) substrate using a vapor phase growth apparatus, wherein: the vapor phase growth apparatus (Fig. 3) comprises a susceptor (Fig. 2, #17, the second susceptor) for performing the vapor phase growth of the silicon ('766 translation, [0005]) epitaxial ([0001]) layer on the main surface (Fig. 3, #5, the top of #5 is a main surface) of the silicon crystal substrate (Fig. 1, #16, epitaxial growth has to be on single crystal) while heating the silicon single crystal substrate from both sides (Fig. 3, heating from left and right sides of each wafer #5) while the substrate is on a pocket (#31) formed on the susceptor (#17); the pocket has an outer peripheral side part (Fig. 2, the outside of #31 which is near the substrate #5) which supports a rear surface of the silicon single crystal substrate and an inner peripheral side part (Fig. 2, the inside of #31) which is kept in a state of being more recessed than the outer peripheral side part in an inside of the outer peripheral side part. (similar to canceled claim 5); and the susceptor is formed by heat-treating a body section (material of #17 is a body) and then coating a surface of the body section with SiC ([0013], line 4, SiC coat carbon), and is formed so that an entirety (the whole of #17 is warped) of a longitudinal sectional shape of the susceptor is warped to an inverted U-shape (Fig. 2, #32, [0015]) during the heat-treating.

'766 teaches an inverted U-shaped formed by Zagury ([0009]), not by heat

Art Unit: 1792

treatment. This is considered as the product by process claim (MPEP 2113) is limited by its structure and the susceptor #17 having crevices #31 and #32, similar to applicant's Fig. 2A, therefore does meet the structure limitations of the warped susceptor.

'766 does not explicitly teaches the other limitation of claim 9:

The susceptor is formed by heat-treating a body section composed of graphite.

'697 is an analogous art in the field of CVD (abstract), particularly in eliminating the bad effect on the exposed portion of the susceptor (col. 2, lines 27-31). '697 teaches that graphite is normally used for susceptor because its workability (col. 3, lines 36-38).

At the time of the invention was made, it would have been obvious to a person of ordinary skill in the art to have adopted graphite as susceptor material as taught by '697 in the apparatus of Fig. 2 of '766, for the purpose of workability.

'766 further teaches the limitations of claim 11:

The susceptor is a type of a single wafer (Fig. 2, each secondary susceptor #17 holds one wafer #5), and a curvature on a rear surface side of the susceptor is $1.75 \times 10^{-5} \text{ mm}^{-1}$ or less.

Based on the information in Table 1 of '766, an 8 inch wafer with an 85 μm depth crevice is equivalent to a curvature of $1.7 \times 10^{-5} \text{ mm}^{-1}$, therefore, '766 taught the limitations of claim 7.

The above combination would also have met the limitations of claim 15:

A depth of the pocket has been reduced (by the heat treatment equivalent of milling process) by a warp amount during the heat-treatment warping of the inverted U-shaped longitudinal sectional shape.

3. Claims 10, 12, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over '766 and '697, further in view of Yao et al. (US 2002/0066412, hereafter '412).

'766 and '697, together, teach all limitations of claims 9 and 15, as discussed above. '766 further teaches the distance between a bottom surface of the inner peripheral side part in the pocket and a rear surface of the silicon single crystal substrate (or the gap) for 200 mm wafers. Although '766 indicates the depth of the gap increases as wafer size increases, the gap depth is well below 0.4 mm (Table 1).

'766 and '697, together, do not explicitly teach the limitations of claims 10 and 16:

The pocket is formed for a silicon single crystal substrate having a diameter of 300 mm or more, and when a silicon single crystal substrate is placed on and supported by the outer peripheral side part of the susceptor, a maximum distance between a bottom surface of the inner peripheral side part in the pocket and a rear surface of the silicon single crystal substrate is less than 0.4 mm.

'412 is an analogous art in the field of chemical vapor deposition, specifically for processing a semiconductor substrate that minimizes contact with the backside of the substrate. '412 provides the gap depth at a range of 0.15 to 0.5 mm for 300 mm wafers (bottom of [0029]), preferably at 0.25 mm.

At the time of the invention was made, it would have been obvious to a person of ordinary skill in the art to have adopted the range provided by '412 and incorporated a 0.25 mm gap depth to the pocket #31 in Fig. 2 of '766, in a susceptor for 300 mm wafers, with a reasonable expectation of success and the expectation of similar results. The selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945) (MPEP 2144.07).

For substantially the same reason as claim 11 above, claim 12 is rejected.

Response to Arguments

Applicant's arguments filed 02/04/2008 have been fully considered but they are not persuasive.

4. Applicant's arguments based on quote of MPEP 2113 "structure implied by process steps must be considered" is correct (see the first paragraph of page 6). However, the next title of this section "ONCE A PRODUCT APPEARING TO BE SUBSTANTIALLY IDENTICAL IS FOUND AND A 35 U.S.C. 102 /103 REJECTION MADE, THE BURDEN SHIFTS TO THE APPLICANT TO SHOW AN UNOBVIOUS DIFFERENCE". Applicant did not provide evidence demonstrating that the heat treating

Art Unit: 1792

a body section would result a structure difference than the Zagury process. Instead, applicant argues '766 does not teach reduced slip dislocation and unexpected result (see the last paragraph of page 8 to top of page 9).

5. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., reduced slip dislocation) are not recited in the rejected claims. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

6. In regarding to Applicant's arguments against Van Bilsen (US 6284048), the argument is moot because the amended claims overcome '048 reference.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KEATH T. CHEN whose telephone number is (571)270-1870. The examiner can normally be reached on M-F, 8:30-5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on 571-272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1792

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/K. T. C./
Examiner, Art Unit 1792

/Michael Cleveland/
Supervisory Patent Examiner, Art Unit 1792